

WHAT IS CLAIMED IS:

1                   1.     A process for producing a reaction bonded silicon carbide body, the  
2 process comprising:  
3                   combining a carbon source, silicon carbide, an organic gelation agent and a  
4 liquid to form a ceramic slurry;  
5                   compacting the ceramic slurry into a green body; and  
6                   exposing the green body to liquid silicon metal to produce a reaction bonded  
7 silicon carbide body.

1                   2.     A process as in claim 1, wherein the carbon source is selected from  
2 the group consisting of carbon black and colloidal graphite, and the silicon carbide comprises  
3 alpha silicon carbide grit.

1                   3.     A process as in claim 1, wherein the ceramic slurry includes about 0  
2 wt% to about 20 wt% carbon black, about 0 wt% to about 15 wt% colloidal graphite, about  
3 40 wt% to about 90 wt% alpha silicon carbide grit, about 0.01 wt% to about 15 wt% organic  
4 gelation agent and about 10 wt% to about 30 wt% liquid.

1                   4.     A process as in claim 1, wherein the organic gelation agent is selected  
2 from a group consisting of corn starch, potato starch, tapioca starch, wheat starch, methyl-  
3 cellulose, substituted derivatives of methyl-cellulose, carboxy-methyl-cellulose gum, guar  
4 gum, sodium alginate, gum arabic, lignosulfonates, polyacrylates, polyvinyl-butyrals and  
5 acrylics.

1                   5.     A process as in claim 1, wherein the ceramic slurry includes about  
2 0.01 wt% to about 5 wt% potato starch as a gelation agent.

1                   6.     A process as in claim 1, further comprising heating the green body to a  
2 temperature of about 1400°C to about 1650°C during siliconization.

1                   7.     A process as in claim 1, wherein siliconization comprises exposing the  
2 green body to about 20 wt% to 150 wt% (based on green body weight) liquid silicon metal.

1                   8.     A process as in claim 1, wherein compacting the ceramic slurry  
2 comprises forcing the ceramic slurry into a porous mold with a pore size of about 2 microns

3 to about 20 microns and applying pressure of about 70 psig to about 600 psig for about 10  
4 seconds to about 240 seconds.

1 9. A process as in claim 1, further comprising agitating the ceramic slurry  
2 continuously at low shear for about 4 hours to about 15 hours under vacuum conditions.

1 10. A process as in claim 1, wherein combining further comprises mixing  
2 the ceramic slurry for about 10 minutes to about 60 minutes using a high shear, high intensity  
3 mixer.

4 11. A process as in claim 1, further comprising drying the green body in a  
5 conveyor drying oven at about 30 °C to about 200 °C for about 5 minutes to about 12  
6 minutes.

7 12. A process as in claim 1, wherein the silicon carbide body comprises an  
armor torso.

8 13. A reaction bonded silicon carbide body produced according to the  
9 process of claim 1.

10 14. A body as in claim 13, wherein the silicon carbide body comprises an  
armor torso.

1 15. A green body, comprising:  
2 silicon carbide in a major amount;  
3 a carbon source in a moderate amount;  
4 an organic gelation agent in a minor amount;  
5 and a liquid in a moderate amount.

6 16. A body as in claim 15, wherein the carbon source is selected from the  
7 group consisting of carbon black and colloidal graphite, and the silicon carbide comprises  
8 alpha silicon carbide grit.

9 17. A body as in claim 15, wherein the green body comprises about 5 wt%  
10 to about 17 wt% carbon black, about 3 wt% to about 11 wt% colloidal graphite, about 60  
11 wt% to about 86 wt% alpha silicon carbide grit, about 0.01 wt% to about 17 wt% organic  
12 gelation agent and about 5 wt% to about 15 wt% liquid.

1 18. A body as in claim 15, wherein the organic gelation agent is selected  
2 from a group consisting of corn starch, potato starch, tapioca starch, wheat starch, methyl-  
3 cellulose, substituted derivatives of methyl-cellulose, carboxy-methyl-cellulose gum, guar  
4 gum, sodium alginate, gum arabic, lignosulfonates, polyacrylates, polyvinyl-butyral and  
5 acrylics.

1 19. A body as in claim 18, wherein the green body comprises about  
2 0.01 wt% to about 5 wt% potato starch as the organic gelation agent.

1 20. A ceramic slurry for producing a reaction bonded ceramic body, the  
2 ceramic slurry comprising:  
3 silicon carbide in a major amount;  
4 a carbon source in a moderate amount;  
5 an organic gelation agent in a minor amount; and  
6 a liquid in a moderate amount.

1 21. A ceramic slurry as in claim 20, wherein the carbon source is selected  
2 from the group consisting of carbon black and colloidal graphite, and the silicon carbide  
3 comprises alpha silicon carbide grit

4 22. A ceramic slurry as in claim 20, wherein the slurry includes about  
5 0 wt% to about 20 wt% carbon black, about 0 wt% to about 15 wt% colloidal graphite, about  
6 40 wt% to about 90 wt% alpha silicon carbide grit, about 0.01 wt% to about 15 wt% organic  
7 gelation agent and about 10 wt% to about 30 wt% liquid.

1 23. A ceramic slurry as in claim 20, wherein the organic gelation agent is  
2 selected from the group consisting of corn starch, potato starch, tapioca starch, wheat starch,  
3 methyl-cellulose, substituted derivatives of methyl-cellulose, carboxy-methyl-cellulose gum,  
4 guar gum, sodium alginate, gum arabic, lignosulfonates, polyacrylates, polyvinyl-butyral  
5 and acrylics.

1 24. A ceramic slurry as in claim 23, wherein the ceramic slurry comprises  
2 about 0.01 wt% to about 5 wt% potato starch as the organic gelation agent.